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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
HERNANDEZ, NELSON D	
ART UNIT	PAPER NUMBER
2622	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	02/08/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/693,455	INUI ET AL.	
	Examiner	Art Unit	
	Nelson D. Hernandez	2622	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 October 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-10* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-10* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *27 October 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *3/1/04 & 10/27/03*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-3, 6, 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's Admitted Prior Art (AAPA).

Regarding claim 1, AAPA discloses a solid-state image sensor (See fig. 6) for outputting, from one line of a sensor array (Fig. 6: 100) including an array of pixel photosensor cells (Fig. 6: 110) or from one of a plurality of lines, which is selected in sequence from the sensor array including the array of the pixel photosensor cells (using vertical shift register circuit 120 as shown in fig. 6), an optical signal (stored in capacitor Cts as shown in fig. 6) and a noise signal (stored in capacitor Ctn as shown in fig. 6) from each of the pixel photosensor cells, n optical signal common output lines (lines 210 and 230 as shown in fig. 6) and n noise-signal common output lines (lines 220 and 240 as shown in fig. 6) (where n is a natural number greater than or equal to 2) (two optical signal lines and two noise signal lines, see fig. 6); means for separately reading (horizontal shift register circuit 140 as shown in fig. 6) out the output optical signals and the noise signals at the n optical-signal common output lines and the n noise-signal common output lines; and n differential output means (Two differential output means

150 as shown in fig. 6) for outputting differential signals between the optical signals and the noise signals output from the corresponding pixel photosensor cells, respectively, to which the optical-signal common output lines and the noise-signal common output lines are connected, the n differential output means including first differential output means and second differential output means (Figs. 6: 170 and 6: 180), wherein the n optical-signal common output lines and the n noise-signal common output lines are arranged parallel to each other (See lines 210, 220, 230 and 240 being arranged parallel to each other), and wherein the first optical-signal common output line (Fig. 6: 210) and the first noise-signal common output line (Fig. 6: 220) are connected to the first differential output means (Fig. 6: 150), and the second optical-signal common output line (Fig. 6: 230) and the second noise-signal common output line (Fig. 6: 240) are connected to the second differential output means (Fig. 6: 150) (Page 2, ¶ 0005 – page 4, ¶ 0007). AAPA discloses that of the n optical-signal common output lines and the n noise-signal common output lines, a first optical-signal common output line, a first noise-signal common output line, a second optical-signal common output line, and a second noise-signal common output line are arranged in the sequence of the first optical-signal common output line, the first noise-signal common output line, the second optical-signal common output line, and the second noise-signal common output line but does not explicitly disclose the sequence of n optical-signal common output lines and the n noise-signal common output lines, a first optical-signal common output line, a first noise-signal common output line, a second optical-signal common output line, and a second noise-signal common output line are arranged in the sequence of the first optical-signal

common output line, the first noise-signal common output line, the second noise-signal common output line, and the second optical-signal common output line. However, although the sequence in AAPA is different, the solid-state image sensor performs equally well since the noise is being removed from the optical signal. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the invention in AAPA by arranging the common lines with the sequence of n optical-signal common output lines and the n noise-signal common output lines, a first optical-signal common output line, a first noise-signal common output line, a second optical-signal common output line, and a second noise-signal common output line are arranged in the sequence of the first optical-signal common output line, the first noise-signal common output line, the second noise-signal common output line, and the second optical-signal common output line as a matter of design choice.

Regarding claim 2, AAPA discloses a shield line to which a fixed potential is supplied is arranged in a same layer as the optical signal common output lines and the n noise-signal common output lines, wherein, of the n optical-signal common output lines and the n noise-signal common output lines, the shield line is arranged between adjacent ones of the noise-signal common output lines, between adjacent ones of the optical-signal common output and the noise-signal common output lines, or outside of the n optical-signal common output lines and the n noise-signal common output lines (See page 10, ¶ 0014).

Regarding claim 3, AAPA discloses that n is 2 (see fig. 6), and a shield line to which a fixed potential is supplied is arranged in a same layer as the first optical-signal common output line, the first noise-signal common output line, the second optical-signal common output line, and the second noise-signal common output line, the shield line being arranged between the first noise-signal common output line and the second noise-signal common output line, between the first optical-signal common output line and the first noise-signal common output line, between the second noise-signal common output line and the second optical-signal common output line, or outside of the first optical-signal common output line and the second optical-signal common output line (See page 10, ¶ 0014).

Regarding claim 6, AAPA discloses that the optical signal and the noise signal from each of the pixel photosensor cells of the selected line are held in an optical-signal holding capacitor (Cts as shown in fig. 6) and a noise-signal holding capacitor (Ctn as shown in fig. 6); and the optical signals and the noise signals associated with one row, which are held in the optical-signal holding capacitors and the noise-signal holding capacitors, are separately read out, via a transfer switch, at the n optical-signal common output lines and the n noise signal common output lines, respectively (Page 2, ¶ 0005 – page 4, ¶ 0007).

Regarding claim 9, limitations have been discussed and analyzed in claim 1.

Regarding claim 10, limitations have been discussed and analyzed in claim 1.

3. Claims 4, 7 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's Admitted Prior Art (AAPA) in view of Ozawa, US Patent 4,500,927.

Regarding claim 4, AAPA fails to teach that n is greater than or equal to 3, and an optical-signal common output line is arranged adjacent to at least one side of a section including the first optical-signal common output line, the first noise-signal common output line, the second noise-signal common output line, and the second optical-signal common output line, which are arranged in this sequence, and the distance between the optical-signal common output line arranged adjacent to the section and the first or second optical-signal common output line included in the section is greater than the distance between the optical-signal and the noise-signal common output lines included in the section.

However, Ozawa teaches a solid-state image sensor (See fig. 2) for outputting, from one line of a sensor array including an array of pixel photosensor cells (Fig. 2: 5) an optical signal and a noise signal from each of the pixel photosensor cells, n (four) optical signal common output lines (line 12b as shown in fig. 2) and n (four) noise-signal common output lines (line 12a as shown in fig. 2) (See other n signal and optical signal common lines from block 15B, 15C and 15C as shown in fig. 2) (where n is a natural number greater than or equal to 2); means (shift register 8 as shown in fig. 2) for separately reading out the output optical signals and the noise signals at the n optical-signal common output lines and the n noise-signal common output lines; and n differential output means (differential amplifiers 14a, 14b, 14c and 14d as shown in fig.

2; see also differential amplifiers 14-a, 14-b, 14-c and 14-d as shown in fig. 6) for outputting differential signals between the optical signals and the noise signals output from a corresponding pixel photosensor cell block (groups of photosensor cells forming the cell block 15), respectively, to which the optical-signal common output lines and the noise-signal common output lines are connected, the n differential output means including first differential output means (Figs. 2: 14a and 6: 14-a), a second differential output means (Figs. 2: 14b and 6: 14-b) a third differential output means (Figs. 2: 14c and 6: 14-c) and a fourth differential output means (Figs. 2: 14d and 6: 14-d), wherein the n optical-signal common output lines and the n noise-signal common output lines are arranged parallel to each other (See figs. 2 and 6, where the optical signal and noise signal common lines are parallel to each other), and, wherein the first optical-signal common output line and the first noise-signal common output line are connected to the first differential output means, the second optical-signal common output line and the second noise-signal common output line are connected to the second differential output means, the third optical-signal common output line and the third noise-signal common output line are connected to the third differential output means and the fourth optical-signal common output line and the fourth noise-signal common output line are connected to the fourth differential output means (Col. 3, line 20 – col. 4, line 55).

Therefore, taking the combined teaching of AAPA in view of Ozawa as a whole, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify AAPA by having the number of noise signal common lines, optical signal common lines and differential output means greater than or equal to 3 with the

motivation of increasing the reading speed of the image sensor (Col. 3, line 59 – col. 4, line 3). Although the combined teaching of AAPA in view of Ozawa fails to teaches an arrangement different than arranging an optical-signal common output line adjacent to at least one side of a section including the first optical-signal common output line, the first noise-signal common output line, the second noise-signal common output line, and the second optical-signal common output line, which are arranged in this sequence, and the distance between the optical-signal common output line arranged adjacent to the section and the first or second optical-signal common output line included in the section is greater than the distance between the optical-signal and the noise-signal common output lines included in the section, as discussed in claim 1, the suggested arrangement in AAPA in view of Ozawa would perform equally well since every differential output means still has a noise signal common line and an optical signal common line. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify AAPA and Ozawa by arranging an optical-signal common output line adjacent to at least one side of a section including the first optical-signal common output line, the first noise-signal common output line, the second noise-signal common output line, and the second optical-signal common output line, which are arranged in this sequence, and the distance between the optical-signal common output line arranged adjacent to the section and the first or second optical-signal common output line included in the section is greater than the distance between the optical-signal and the noise-signal common output lines included in the section as a matter of design choice.

Regarding claim 7, the combined teaching of AAPA in view of Ozawa teaches the solid-state image sensor for a camera (facsimile device or other optical equipment as shown in Ozawa, col. 1, lines 5-10) comprising a processor that processes an image captured by the solid-state image sensor (an image processor is inherent in a facsimile device since it is expected to have said processor to process the captured images for either storing, printer or transmitting to another device).

Regarding claim 8, the combined teaching of AAPA in view of Ozawa teaches the solid-state image sensor for a camera control system (facsimile device or other optical equipment as shown in Ozawa, col. 1, lines 5-10) comprising a processor that processes an image captured by the solid-state image sensor (an image processor is inherent in a facsimile device since it is expected to have said processor to process the captured images for either storing, printer or transmitting to another device).

4. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over AAPA in view of Vogelsong, US Patent 4,768,098.

Regarding claim 5, AAPA fails to teach that the read out timing of the optical signal and the noise signal at the first optical-signal common output line and the first noise-signal common output line connected to the first differential output means of the n differential output means is made to differ from that at the second optical-signal common output line and the second noise-signal common output line connected to the second differential output means adjacent to the first differential output means by

shifting the phase between the first differential output means and the second differential output means.

However, having a phase shifting between two lines to have a delay applied to one output signal from one signal line with respect to a second to a second output signal I well known in the art as taught by Vogelsong. Vogelsong teaches an image sensor wherein the a delay is being applied to a first output line with respect to a second output line so that the line are read at different time intervals from each other in order to remove the noise form the signal lines at also different times (Col. 4, lines 33-63; col. 6, line 30 – col. 7, line 32).

Therefore, taking the combined teaching of AAPA in view of Vogelsong as a whole, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify AAPA by using the teaching of reading the different lines with a phase between each of the read signals to have the read out timing of the optical signal and the noise signal at the first optical-signal common output line and the first noise-signal common output line connected to the first differential output means of the n differential output means is made to differ from that at the second optical-signal common output line and the second noise-signal common output line connected to the second differential output means adjacent to the first differential output means by shifting the phase between the first differential output means and the second differential output means. The motivation to do so would have been to crosstalk between signal lines in the image sensor as suggested by Vogelsong (Col. 7, lines 12-32).

Conclusion

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Hatanaka et al., US Patent 4,634,886, discloses arranging all the noise lines as a group and all the signal lines also as a group and then sequentially selecting the image signal and noise signal from the respective groups to perform noise reduction on the image signal. By arranging the noise and signal lines this way Hatanaka et al. teaches reducing cross talk without using any blocking device (See fig. 3, Col. 3, line 15+).

Contact

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nelson D. Hernandez whose telephone number is (571) 272-7311. The examiner can normally be reached on 8:30 A.M. to 6:00 P.M..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vivek Srivastava can be reached on (571) 272-7304. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Nelson D. Hernandez
Examiner
Art Unit 2622

NDHH
January 25, 2007

TUAN HO
PRIMARY EXAMINER